Reg. No. :

Question Paper Code: 49311

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Elective

Electrical and Electronics Engineering

14UEE911 - FUZZY LOGIC AND NEURAL NETWORK

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The cardinality of fuzzy sets on any universe is

    (a) 0   (b) +1   (c) ∞ (d) -1

2. Considering a graphical representation of the `tallness' of people using its appropriate member function, which of the following combinations are true?

    (i)   TALL is usually the fuzzy subset
    (ii) HEIGHT is usually the fuzzy set
    (iii) PEOPLE is usually the universe of discourse

    (a) i, ii & iii   (b) i & ii only
    (c) i, iii only   (d) ii & iii

3. Where does the Bayes rule can be used?

    (a) Solving queries   (b) Increasing complexity
    (c) Decreasing complexity   (d) Answering probabilistic query

4. Fuzzy logic is usually represented as

    (a) IF-THEN-ELSE rules   (b) IF-THEN rules
    (c) Both (a) & (b)   (d) None of these

5. A perceptron is

    (a) a single layer feed-forward neural network with preprocessing

    (b) an auto associative neural network

    (c) a double layer auto associative neural network

    (d) None of these

6. A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. The output will be

    (a) 238   (b) 76   (c) 119   (d) 154

7. The network that involves backward links from output to the input and hidden layers is called as

    (a) Self organizing maps   (b) Perceptrons

    (c) Recurrent neural network   (d) Multi layered perceptron

8. What is back propagation?

    (a) It is another name given to the curvy function in the perceptron

    (b) It is the transmission of error back through the network to adjust the inputs

    (c) It is the transmission of error back through the network to allow weights to be
         adjusted so that the network can learn

    (d) None of these

9. In a power system fault detection problem, the best neural network architecture that can be implemented is

    (a) Multilayer Perceptron   (b) Back Propagation Network

    (c) Hopfield Network   (d) Kohonen Self-organizing map

10. What are the advantages of neural networks over conventional computers?

    (i)   They have the ability to learn by example

    (ii) They are more fault tolerant

    (iii) They are more suited for real time operation due to their high 'computational'
         rates

    (a) (i) and (ii) are true   (b) (i) and (iii) are true

    (c) all of them are true   (d) None of these

PART - B (5 x 2 = 10 Marks)

11. What is type-2 FL exactly?

12. Can a fuzzy membership be True and False at the same time?

13. With a supervised learning algorithm, we can specify target output values, but we may never get close to those targets at the end of learning. Give two reasons why this might happen.

14. What are recurrent networks?

15. List few applications of fuzzy logic and artificial neural network.

PART - C (5 x 16 = 80 Marks)

16. (a) Draw the block diagram of fuzzy logic. Explain in brief the basic concepts of fuzzy logic control. (16)

Or

(b) Fuzzy logic provides an alternative solution to non-linear control because it is closer to the real world. Give reasons. (16)

17. (a) (i) Model the following as a fuzzy set using suitable membership function – "Numbers close to 5". (8)

(ii) Distinguish between supervised and unsupervised learning with suitable example. (8)

Or

(b) Illustrate the properties of fuzzy set theory and explain with suitable schematics. (16)

18. (a) Explain why a single-layer perceptron cannot solve the XOR problem. Use an X_1 vs X_2 plot to show that a straight line cannot separate the XNOR states. List the several aspects to keep in mind when selecting an appropriate neural network structure. (16)

Or

(b) Draw and explain the architecture of back propagation network. Also derive the updation of hidden layer weights. (16)

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19. (a) Give the comparison between the radial basis-function networks and the multilayer perceptron? Train the home made robot using recurrent back propagation algorithm.

(16)

Or

(b) Explain in detail the procedure for designing the neural network using competitive learning. (16)

20. (a) (i) Explain applications of Genetic algorithm in medical science. (8)

(ii) Advantages of fuzzy logic control over the artificial neural networks. (8)

Or

(b) (i) State applications of Kohnen self-organizing map. (8)

(ii) Explain adaptive and Resonance theory. (8)

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